

1966 OPERATING SUMMARY

SAULT STE. MARIE

water pollution control plant

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

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ONTARIO WATER RESOURCES COMMISSION
OFFICE OF THE GENERAL MANAGER

Members of the Sault Ste. Marie Local Advisory Committee,
City of Sault Ste. Marie.

Gentlemen:

We are pleased to submit to you the 1966 Operating Summary for the Sault Ste. Marie Water Pollution Control Plant, OWRC Project No. 58-S-20.

It is hoped that our joint participation in efforts to combat water pollution will have even more success in the coming year.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly", is written over the typed name.

D. S. Caverly,
General Manager.



ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET

TORONTO 5

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VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MACDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am happy to present you with the 1966 Operating Summary for the Sault Ste. Marie Water Pollution Control Plant, OWRC Project No. 58-S-20.

The report offers a concise summary of operating data for the year and comparisons with previous years where these are applicable and significant.

Yours very truly,

A handwritten signature in cursive script, reading "B. C. Palmer".

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

● This operating summary contains complete information on the management of the project during 1966. It contains a concise review of the year's plant operation, significant financial details, and a visual presentation in graphs and charts of technical performance.

The information will be of value to interested parties in assessing the adequacy of the project at this time and its ability to meet future requirements.

The report is the result of co-operation by several groups within the Division of Plant Operations. These include the statistics section and the technical publications section. The Division of Finance and the draughting section of the Division of Sanitary Engineering were also closely associated with its publication.

The Regional Operations Engineer, however, has had the primary responsibility for the content, and will be happy to answer any questions regarding it.

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SAULT STE. MARIE
water pollution control plant
operated for

THE CITY OF SAULT STE. MARIE

by the

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Assistant Director: C. W. Perry
Regional Supervisor: A. C. Beattie
Operations Engineer: A. Clark

801 Bay Street Toronto 5

'66 REVIEW

The average daily flow for the year was 7.32 mgd or 91.5% of plant hydraulic capacity. The total plant flow in 1966 was 162.19 mg less than in 1965. This was due in part to the light spring run off. The flow exceeded the plant hydraulic capacity 25% of the time. However, the average strength of the raw sewage was considerably below normal.

The cost of operating the vacuum filters was reduced in 1966 to \$6.20 per dry ton. This was an 18% reduction from 1965.

As in 1965, considerable man hours were spent at the Pim Street and Clark Creek sewage pumping stations. During spring run-off, stand-by portable pumps were provided in case the stand-by Diesel pumps malfunctioned.

The plant is attended 16 hours per day, seven days per week by a superintendent and staff of nine men.

There were routine inspections by the operations engineer and his assistant.

There was one equipment inspection by the maintenance section, and the Special Services section did an inspection on the stand-by engines.

The Safety Officer made a visit late in the year.

PROJECT COSTS

NET CAPITAL COST (Final)		\$3,244,149.35
DEDUCT - Portion Financed by CMHC (Final)	\$2,145,572.61	
- Payments from Municipalities	<u>2,900.00</u>	<u>2,148,472.61</u>
Long Term Debt to OWRC		<u>\$1,095,676.74</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966		\$ <u>127,750.28</u>
Net Operating		\$ 126,102.15
Debt Retirement		22,110.00
Reserve		19,891.69
Interest Charged		61,645.30
		<u> </u>
TOTAL		\$ <u>229,749.14</u>

RESERVE ACCOUNT

Balance at January 1, 1966	\$ 86,545.96
Deposited by Municipality	19,891.69
Interest Earned	5,073.96
	<u> </u>
	\$ 111,511.61
Less Expenditures	<u>4,469.93</u>
Balance at December 31, 1966	\$ <u>107,041.68</u>

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER
JAN	9479.98	3833.50	257.80		2191.28	761.79	17.86	76.20	444.10	1844.98	52.47
FEB	8386.19	3781.17	477.76	490.72	678.30		317.51	40.30	876.31	1641.13	82.99
MARCH	9974.13	4461.02		660.25	2187.43	310.23	523.40	386.40	311.82	1012.62	120.96
APRIL	12346.93	7726.11		(24.64)	668.80	684.93	143.92		1816.68	1239.48	91.70
MAY	7966.32	4454.79			2146.09	63.93	85.20	51.45	125.96	943.55	95.35
JUNE	20917.78	4886.94		243.50	637.52	3355.95	285.22	295.55	1203.10	9906.34	103.66
JULY	5942.67	4444.62			994.25		205.85		809.96	(771.98)	259.97
AUG	9165.06	4559.12	293.17		1582.24	898.78	297.82		219.28	998.39	316.26
SEPT	12586.48	6410.91	455.23	174.04	1562.08	2314.23	50.37	1001.97	26.59	171.07	420.99
OCT	9135.13	4077.23	377.56		628.45	274.05	258.67		154.80	3155.54	208.83
NOV	10042.06	4104.54	396.25	124.34	2034.67	2332.79	234.51		284.87	97.91	432.18
DEC	10159.37	4355.45		254.60	859.99	73.76	747.18		244.12	3440.35	183.92
TOTAL	126102.15	57095.40	2257.77	1922.81	16171.10	11069.44	3167.51	1851.87	6517.59	23679.38	2369.28

* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$11,935.60
BRACKETS INDICATE CREDIT

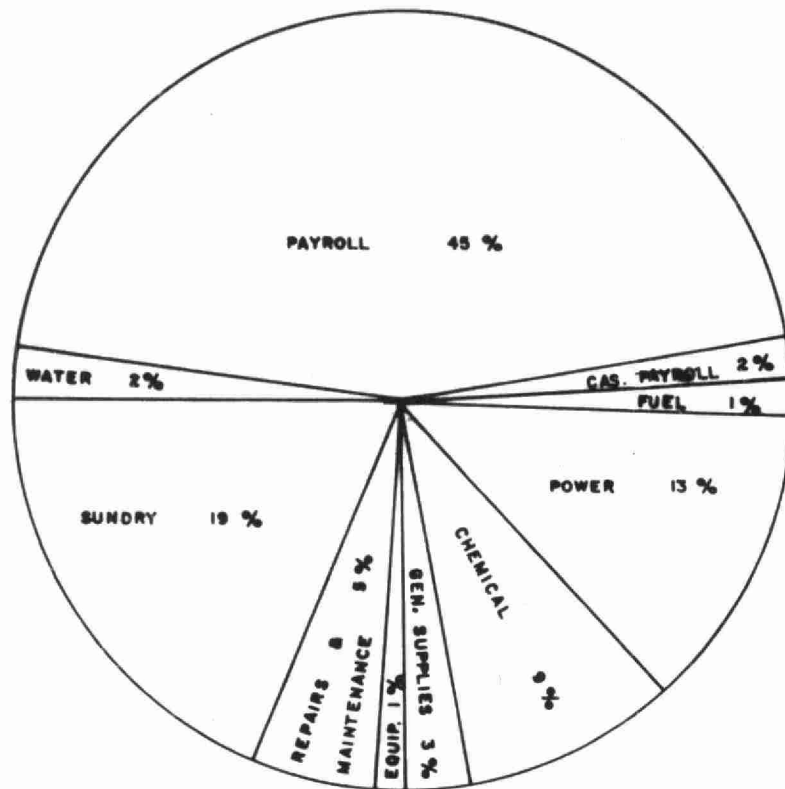
YEARLY OPERATING COSTS

YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1962	** 1601.26	\$ 96,491.83	\$ 6.28	\$ 57.30	11 CENTS
1963	1764.94	\$107,538.08	\$ 6.75	\$ 61.00	10 CENTS
1964	2432.62	\$112,623.50	\$ 6.32	\$ 46.29	12 CENTS
1965	2831.10	\$122,349.41	\$ 6.86	\$ 43.22	7 CENTS
1966	2668.91	\$126,102.15	\$ 6.82	\$ 47.25	5 CENTS

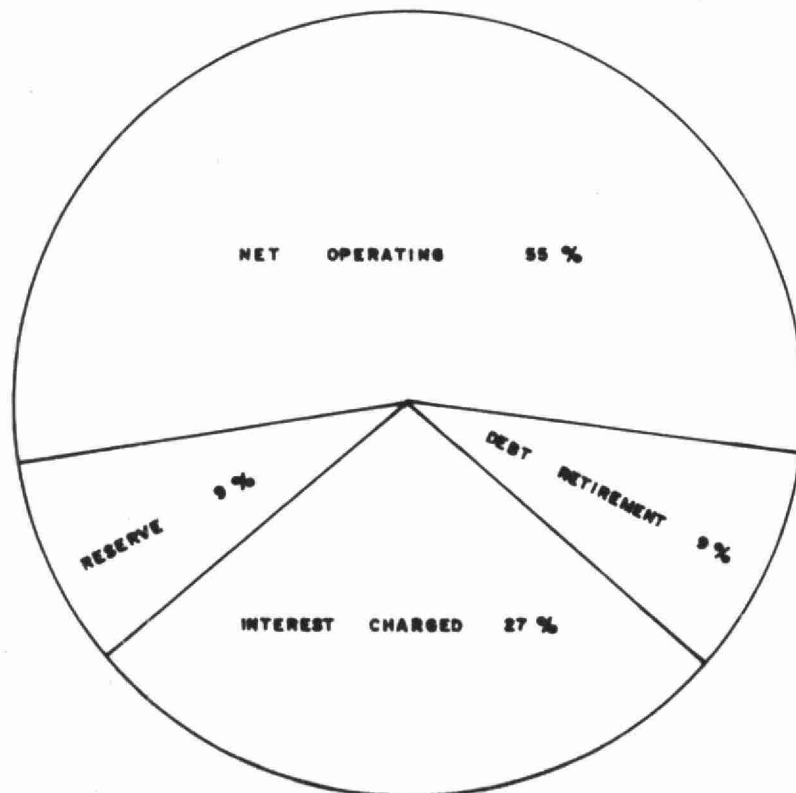
* BASED ON ANNUAL POPULATION ESTIMATE AND 3.9 PERSONS PER FAMILY

** PLANT STARTED IN FEBRUARY, 1962

1966 OPERATING COSTS



TOTAL ANNUAL COST

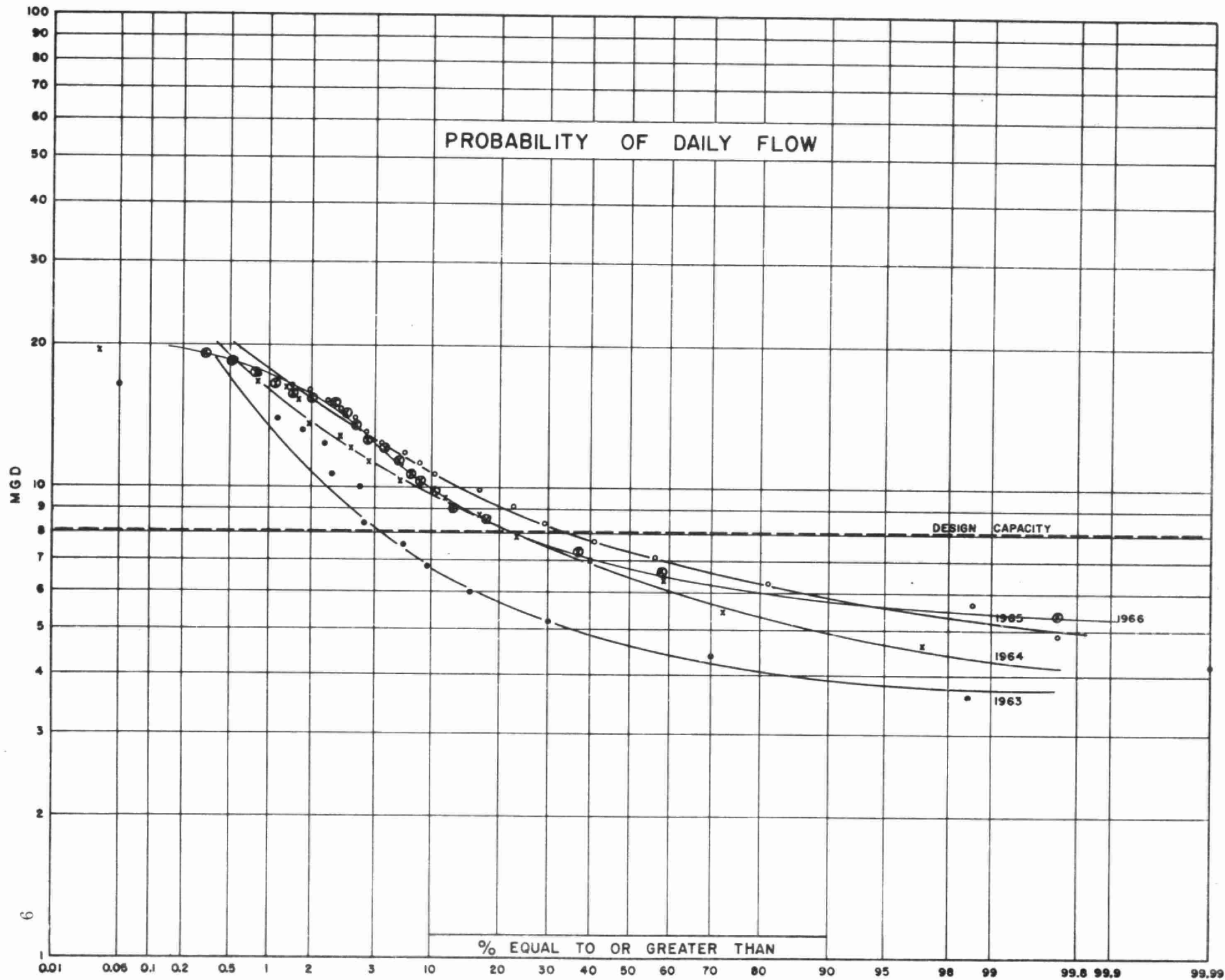


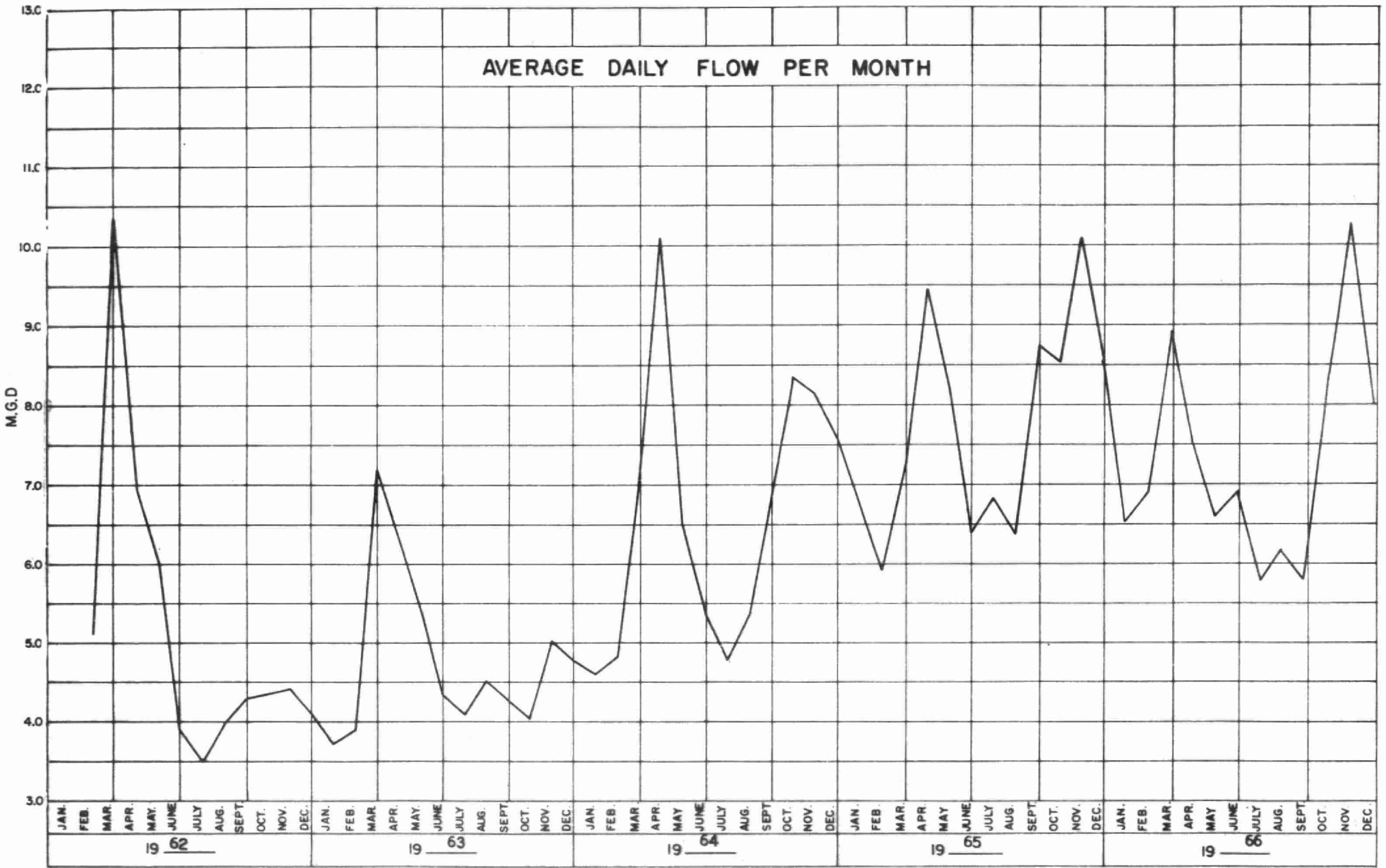
Process Data

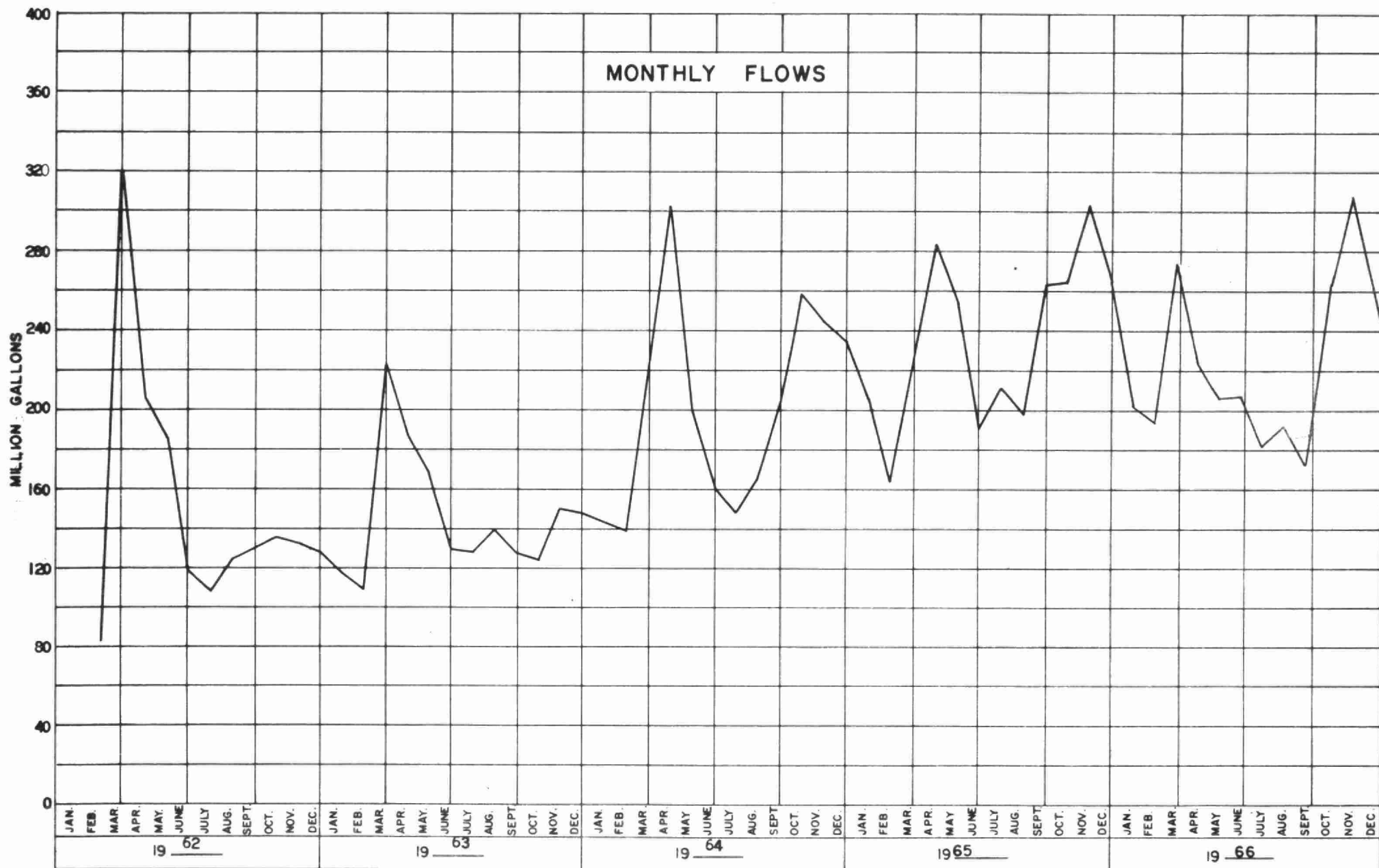
There was a slight decrease in flow in 1966. However, the plant was hydraulically overloaded 25% of the time, compared with an overload 35% of the time in 1965.

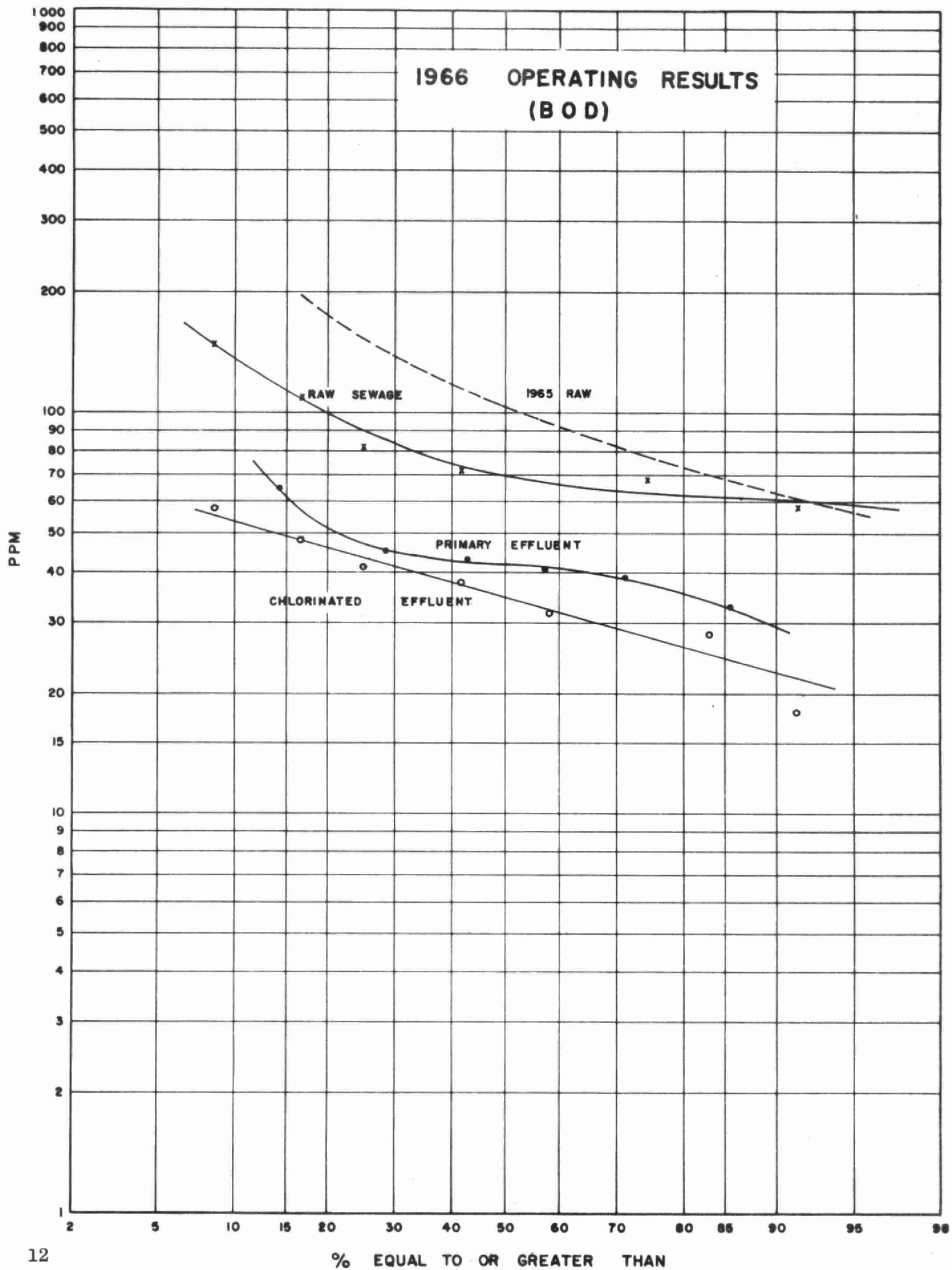
This can be explained by the gradual spring thaw in 1966, and a dry summer.

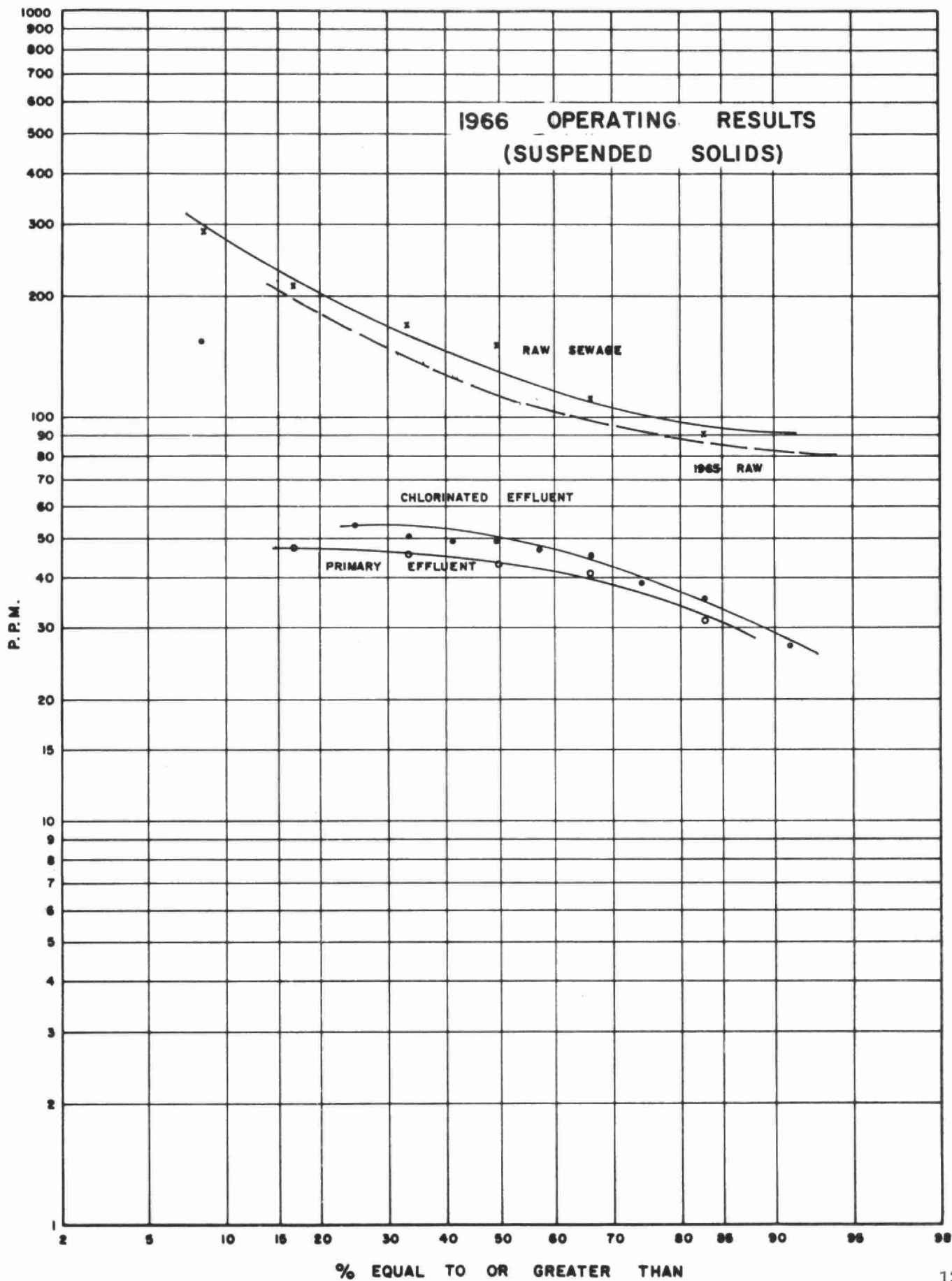
Infiltration is still a problem with parts of the sewer system. The strength of the raw sewage was weaker than the accepted normal 80% of the time.

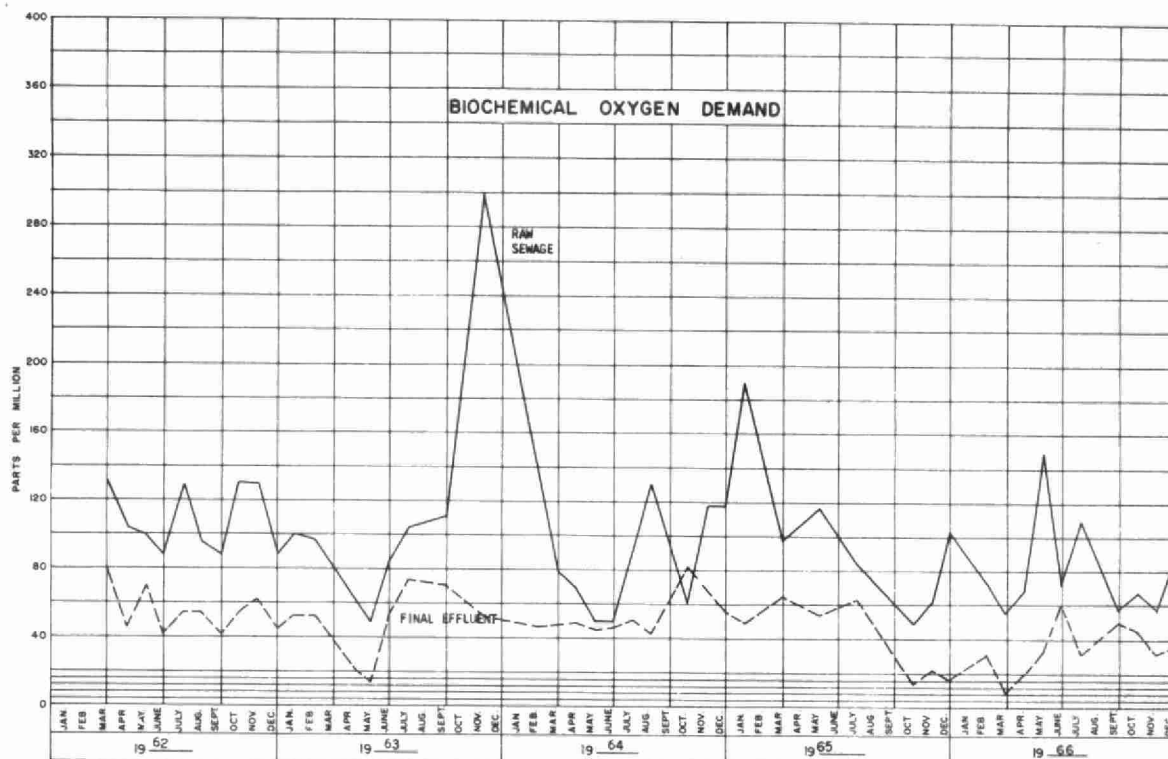




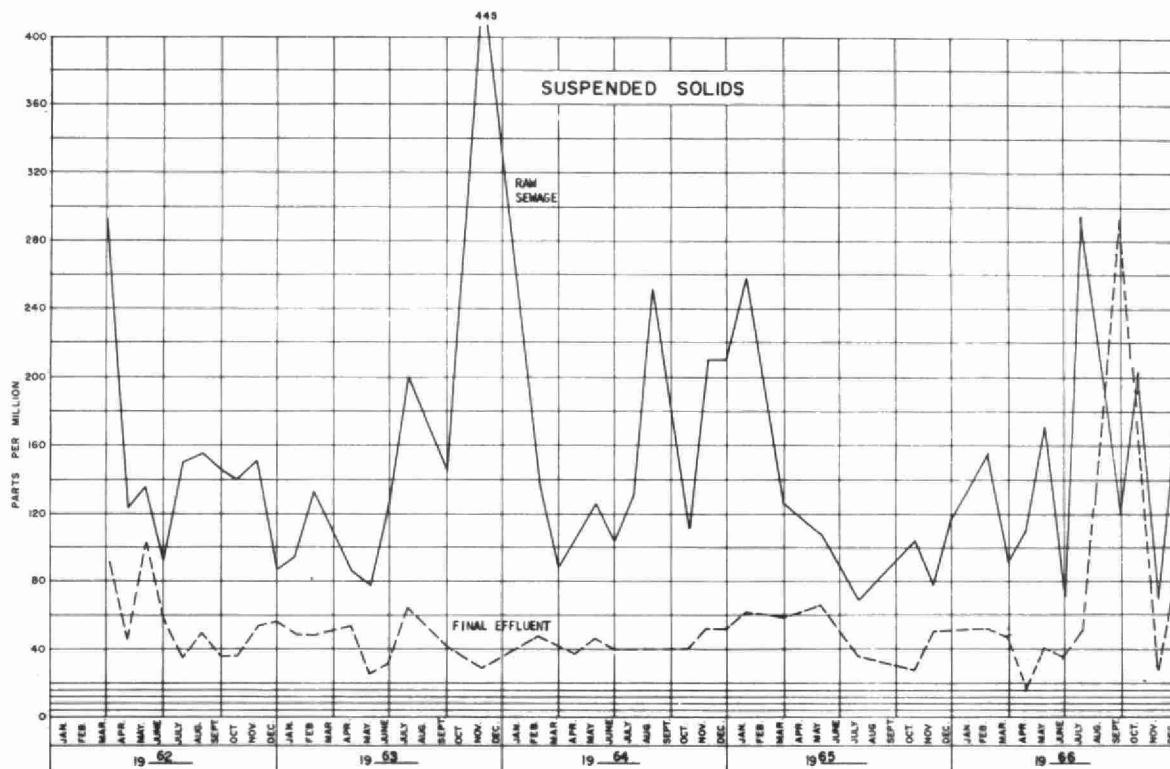








MONTHLY VARIATIONS



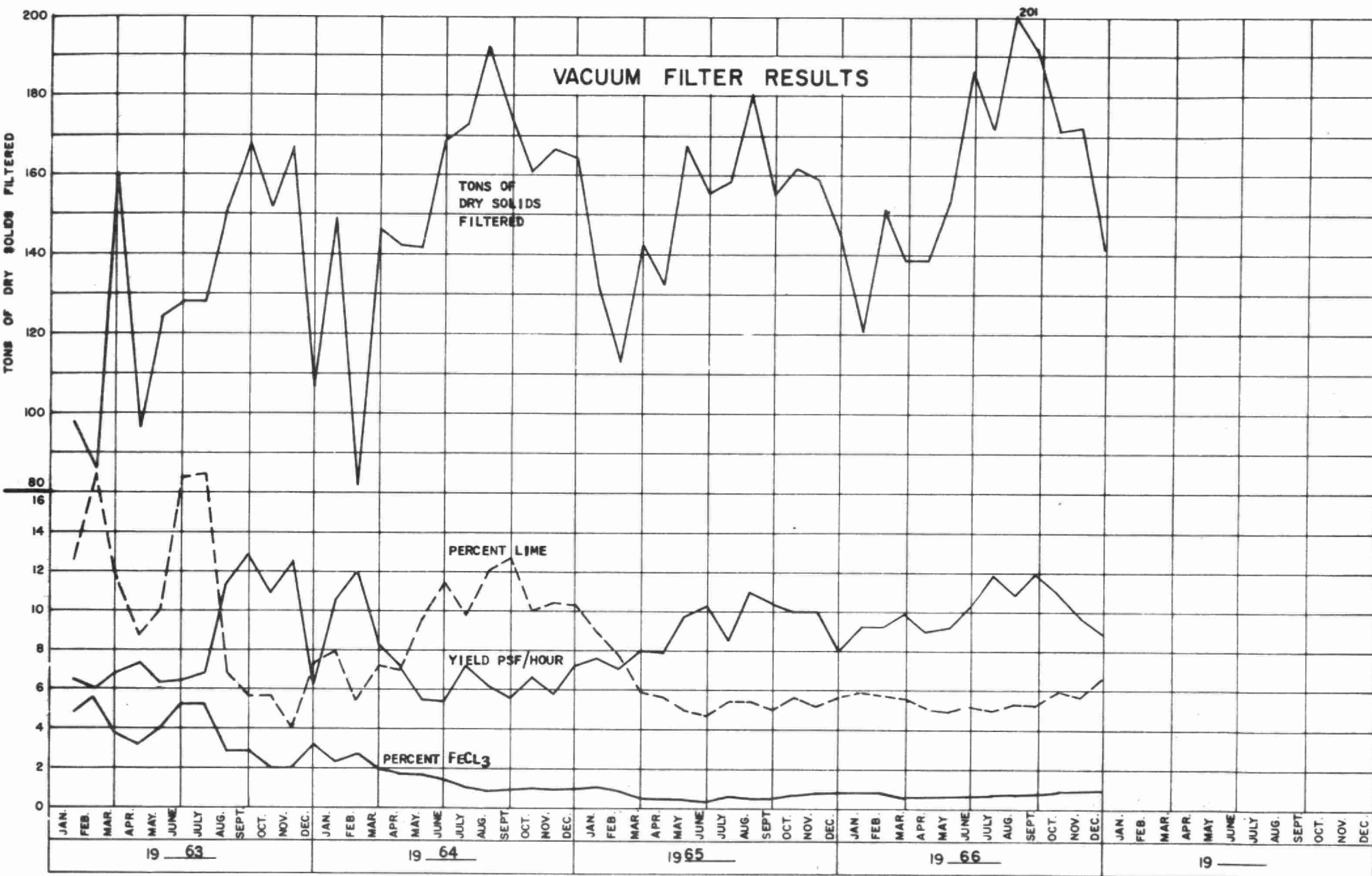
GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	78	33	57.5	45.3	145	55	62.0	90.7	314
FEB.	72	30	58.5	40.6	154	51	67.0	59.5	477
MAR.	54	9	83.5	61.7	90	47	48.0	58.9	177
APR.	67	18	73.0	54.8	113	16	86.0	108.6	96
MAY	148	31	79.0	120.1	170	40	76.5	133.5	95
JUNE	71	59	17.0	12.4	70	35	50.0	36.1	636
JULY	108	30	72.0	70.8	294	50	83.0	221.5	221
AUG.	78	33	57.5	43.1	145	55	62.0	86.2	313
SEPT.	56	48	14.0	6.9	120	46	61.5	63.9	500
OCT.	66	44	33.5	28.8	202	152	24.5	65.5	308
NOV.	56	30	46.5	40.0	68	28	59.0	61.6	414
DEC.	85	34	60.0	63.3	168	82	51.0	106.8	182
TOTAL	-	-	-	600.5	-	-	-	880.7	3733
AVG.	78	33	57.5	50.0	145	55	62.0	1201.0	311

COMMENTS

The percent removal of 57.5 and 45.5 of BOD and SS respectively is considered average for a primary treatment plant.

Influent concentration of BOD and SS indicate a weaker sewage.



VACUUM FILTER OPERATION

MONTH	FILTER HOURS		% SOLIDS DIGEST SLUDGE	LBS. DRY SOLIDS FILTERED	* LBS. LIME	* % LIME	LBS. FeCl ₃	% FeCl ₃	% SOLIDS FILTERED SLUDGE	YIELD PSF/HOUR
	# ₁	# ₂								
JAN.	66	66	5.60	242395	9765	4.0	1649	0.7	24.9	9.25
FEB.	82	82	5.80	302856	12040	4.0	2109	0.7	25.7	9.20
MAR.	71	71	5.90	276945	10850	3.9	1492	0.5	25.5	9.80
APR.	77	77	5.75	276932	9870	3.6	1404	0.5	25.9	8.95
MAY.	83	83	6.20	305602	10500	3.4	1433	0.5	25.0	9.10
JUNE	94	95	6.80	367499	13195	3.6	1704	0.5	26.8	10.15
JULY	76	75	8.10	341009	11655	3.4	2096	0.6	27.2	11.80
AUG.	92	92	7.65	401066	14700	3.7	2594	0.6	27.5	10.85
SEPT.	80	80	7.90	382588	13965	3.7	2773	0.7	27.2	11.80
OCT.	78	79	7.10	341381	13790	4.0	2567	0.8	27.6	10.85
NOV.	91	91	6.10	343491	13545	3.9	2598	0.8	25.8	9.65
DEC.	79	79	5.90	284264	12670	4.5	2136	0.8	24.8	8.75
TOTAL	969	970	-	3866028	146545	-	24555	-	-	-
AVG.	81	81	6.57	322169	12212	3.8	2046	0.6	26.2	10.01

* LIME IS EXPRESSED AS 100% CAO

COMMENTS

The above table gives relevant data for the filtration of raw sludge.

The percent concentration of filtered sludge of 26.2 is considered good for the type of units in service.

The percentages of ferric chloride and lime used are very low.

The good yield, low number of hours of operation and small quantities of chemicals used is due to good operation, preconditioning facilities and the nature of the raw sludge.

VACUUM FILTER COSTS (MONTHLY)

MONTH	COST PER MONTH					TOTAL	COST PER TON DRY WEIGHT					TOTAL
	FeCl ₃	LIME	LABOUR	ELEC	MAINT		FeCl ₃	LIME	LABOUR	ELEC	MAINT	
JANUARY	117.90	122.05	383.33	121.20	48.48	792.96	0.97	1.01	3.16	1.00	0.40	6.54
FEBRUARY	150.79	150.50	476.26	151.43	60.57	989.55	1.00	0.99	3.14	1.00	0.40	6.53
MARCH	106.68	135.62	412.37	138.47	55.39	848.53	0.77	0.98	2.98	1.00	0.40	6.13
APRIL	100.39	123.38	447.22	138.47	55.39	864.85	0.72	0.89	3.23	1.00	0.40	6.24
MAY	102.46	131.25	482.00	152.80	61.12	929.69	0.67	0.86	3.15	1.00	0.40	6.08
JUNE	121.84	164.95	548.86	183.75	73.50	1092.90	0.66	0.90	2.99	1.00	0.40	5.95
JULY	149.86	145.70	438.50	170.50	68.20	972.76	0.88	0.85	2.57	1.00	0.40	5.70
AUGUST	185.47	183.75	534.34	200.53	80.21	1184.30	0.92	0.92	2.67	1.00	0.40	5.91
SEPTEMBER	198.27	174.55	464.64	191.29	76.52	1105.27	1.04	0.91	2.43	1.00	0.40	5.78
OCTOBER	183.54	172.38	455.93	170.69	68.28	1050.82	1.08	1.01	2.67	1.00	0.40	6.16
NOVEMBER	185.76	169.30	528.53	171.75	68.70	1124.04	1.08	0.99	3.08	1.00	0.40	6.55
DECEMBER	152.77	158.38	458.83	142.13	56.85	968.91	1.07	1.11	3.23	1.00	0.40	6.81
TOTAL	1755.68	1831.81	5630.87	1933.01	773.21	11924.58						
AVERAGE PER MONTH	146.31	152.65	469.24	161.08	64.43	993.72	0.90	0.92	2.94	1.00	0.40	6.20

COMMENTS

The low unit costs per dry ton are considered excellent.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	201.49	-	-
FEBRUARY	193.26	-	-
MARCH	274.08	-	-
APRIL	223.89	-	-
MAY	205.34	* 4085	4.75
JUNE	206.41	10140	4.91
JULY	181.55	10080	5.55
AUGUST	191.66	10615	5.54
SEPTEMBER	172.83	11190	6.47
OCTOBER	262.00	11760	4.49
NOVEMBER	308.14	** 1625	2.64
DECEMBER	248.26	-	-
TOTAL	2668.91	59495	-
AVERAGE	222.41	8499	5.12

* 13 days chlorination

** 6 days chlorination

COMMENTS

Plant effluent is chlorinated from March 15 to November 15 of each year.

During 1966 chlorination was required at a rate of 5.12 ppm to maintain a residual of 0.5 ppm after 15 minutes. This is low for this type of plant and is due to the relatively low BOD of the effluent.

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CONCLUSIONS

Although the strength of the raw sewage is relatively low, the plant is hydraulically overloaded some 25% of the time, usually in spring and late fall.

This overload causes pumping problems at the sewage pumping stations at Pim Street and Clark Creek. The problem is more acute at Clark Creek since there is no effective by-pass overflow. Due to the gradual spring thaw in 1966, no emergencies occurred.

RECOMMENDATIONS

Clark Creek Sewage Pumping Station should be enlarged as soon as possible.

The City should continue its efforts to separate storm and sanitary flows.

